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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/008,379	11/05/2001	Garrick Maenle	CYM-037	4705

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EXAMINER

FINEMAN, LEE A

ART UNIT PAPER NUMBER

2872

DATE MAILED: 12/13/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/008,379

Applicant(s)

MAENLE ET AL.

Examiner

Lee Fineman

Art Unit

2872

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 27 October 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 130-137, 139-144 and 169-177 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 130-137, 139-144, 169-175 and 177 is/are rejected.
- 7) ☒ Claim(s) 176 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 30 September 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 27 October 2006 has been entered in which claims 130 and 134-136 were amended, claims 169-177 were added and claim 138 was cancelled. Claims 130-137, 139-144 and 169-177 are pending.

Claim Objections

2. Claims 132, 137 and 172 are objected to because of the following informalities:

Claim 132 includes the limitation "wherein the performance of each fine focus action comprises determining a **fine in-focus coordinate** along the focal axis." It is unclear whether this coordinate is the same one as listed in newly amended independent claim 130, from which claim 132 depends, or a different coordinate. For the purposes of examination it will be taken to be the same fine in-focus coordinate. The dependent claims inherit the deficiencies of the claims from which they depend.

Claim 172 requires a period. The claim(s) must be in one sentence form only.

Appropriate correction is required.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

4. Claims 130-137, 139-144, 169-170, 173 and 177 are rejected under 35 U.S.C. 102(e) as being anticipated by Douglass, US 6,215,892 B1.

Regarding claims 130, 132, 137 and 169, Douglass et al. disclose an automatic focusing method (see figs. 13-15) for an optical system (see figs. 1-2) comprising: performing an initial coarse focus action (see column 11, lines 9-32 and fig. 13A, steps 220-230) along a focal axis (Z) at a scan position corresponding to a point on a surface of a slide (220); and respectively performing a plurality of subsequent fine focus actions (see column 11, lines 33-40 and fig. 13A, steps 232-240) along a plurality of focal axes (238) at a plurality of scan positions (see at least column 9, line 66-column 10, line 11) corresponding to different points on the slide surface (see fig. 15), wherein the performance of at least one/each of the fine focus actions comprises obtaining images of the slide (see at least step 234) each of which has a two-dimensional array of pixels of 640x480 (with CCD camera 42, see column 6, lines 30-33 and column 14, lines 22-24) at a plurality of coordinates within a predetermined range along the respective focal axis (238), and selecting one of the plurality of coordinates as a fine in-focus coordinate (244) based on an examination of the pixel arrays of the image (fig. 13A).

Art Unit: 2872

Regarding claim 131, Douglass et al. further disclose wherein the coordinates are evenly distributed within the predetermined range (80, see fig. 15 at least when all points are “adequate”).

Regarding claim 133, Douglass et al. further disclose wherein the performance of each coarse focus action comprises determining a coarse in-focus coordinate (fig. 13A, steps 220-230) along the focal axis (Z axis).

Regarding claim 134, Douglass et al. further disclose wherein the performance of each fine focus action is based on the in-focus coordinate determined in the coarse focus action (fig. 13A and column 9, line 66-column 10, line 11).

Regarding claim 135 and 177, Douglass et al. further disclose wherein the performance of at least one of the fine focus actions comprises estimating an in-focus coordinate along the respective focal axis as a function of the in-focus coordinate a global focal plane (see figs. 11, 12 and 15) and wherein the at least one of the fine focus actions comprises the plurality of fine focus actions (fig. 13A, steps 232-240).

Regarding claim 136, Douglass et al. further disclose wherein the performance of the coarse focus action comprises repeatedly obtaining an image of the slide at different coordinates along the focal axis until a coarse in-focus coordinate is determined (fig. 13A, steps 220-230).

Regarding claims 139-140 and 173, Douglass et al. further disclose wherein the performance of at least one of the coarse focus action and each fine focus action comprises: obtaining images of the slide at a plurality of coordinates (steps 222 and 234) along the focal axis (Z); determining a plurality of focus scores (pixel variance); and selecting one of the coordinates as an in-focus coordinate based on the maximum focus score (244 and column 11, lines 33-40).

Art Unit: 2872

Regarding claim 141, Douglass et al. further disclose wherein the slide carries a biological specimen (column 5, lines 3-5).

Regarding claim 142, Douglass et al. further disclose wherein the coarse focus action and the fine focus action are performing during a single image scan (see figs. 14 and 15).

Regarding claim 143, Douglass et al. further disclose wherein the performance of one or both of the coarse focus action and fine focus actions comprises moving an element (46, see fig. 2) of the optical system relative to the slide surface to coordinates along the respective focal axes.

Regarding claim 144, Douglass et al. further disclose wherein the performance of the fine focus actions comprises moving an element (38) of the optical system relative to the slide along a scan axis (X axis and/or Y axis) to the respective scan positions.

Regarding claim 170, Douglass et al. further disclose wherein the examination of each of the pixel array comprises comparing pixels to each other (pixel variance see steps 222 and 234).

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claim 175 is rejected under 35 U.S.C. 103(a) as being unpatentable over Douglass et al. in view of Dunlay et al., US 7,117,098 B1.

Art Unit: 2872

Douglass et al. discloses the claimed invention except for wherein the slide comprises at least three fiducial points and the method further comprises determining the global focal plane based on the at least three fiducial points. Dunlay et al. teaches in column 14, line 65-column 15, line 41 focusing techniques using at least three fiducial points to define the global focal planes is known in the microscope art. It would have been obvious to one of ordinary skill in that art at the time the invention was made to use at least three fiducial points as taught by Dunlay et al. in the system of Douglass et al. to provide better sample location accuracy for faster focusing.

7. Claims 171-172 and 174 are rejected under 35 U.S.C. 103(a) as being unpatentable over Douglass et al. in view of Brenner et al., "An Automated Microscope for Cytological Research: A Preliminary Evaluation," The Journal of Histochemistry and Cytochemistry, Vol. 24, No. 1, pp. 100-111, 1976.

Douglass et al. discloses the claimed invention except for wherein the pixel comparison comprises comparing gray scale values of the pixels; wherein the gray scale value comparison comprises comparing gray scale values between pairs of pixels separated by a fixed number of pixels; and wherein the focus score for each of the pixel arrays is determined in accordance with the equation $f(z) = \sum \sum (G_i(z) - G_{i+n}(z))^2$, where i is an index ranging over all imaging points, in order, along a scan line j , n is an integer, z is a position along the focal axis, G_i is the transmission gray level between pairs of points separated by n pixels, and $f(z)$ is the focus score. Brenner et al. teaches an autofocussing method including comparing gray scale values of the pixels; wherein the gray scale value comparison comprises comparing gray scale values between pairs of pixels separated by a fixed number of pixels; and wherein the focus score for each of the

Art Unit: 2872

pixel arrays is determined in accordance with the equation $f(z) = \sum \sum (G_i(z) - G_i + n(z))^2$, where i is an index ranging over all imaging points, in order, along a scan line j , n is an integer, z is a position along the focal axis, G_i is the transmission gray level between pairs of points separated by n pixels, and $f(z)$ is the focus score (see automatic focus evaluation section, pages 109-110).

It would have been obvious to one of ordinary skill in that art at the time the invention was made to a gray scale comparison as taught by Brenner et al. in the system of Douglass et al. to provide fast, accurate repeatable focusing of samples (see Brenner et al, page 110, column 2).

Allowable Subject Matter

8. Claim 176 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

9. The following is a statement of reasons for the indication of allowable subject matter:

Claim 176 has allowable over the prior art for at least the reason that the prior art fails to teach and/or suggest “determining a scan axis slope, index axis slope, and focus intersect of the global focal plane based on the positions of the at least three fiducial points” as set forth in the claimed combination.

Response to Arguments

10. Applicant's arguments with respect to claims 130-137 and 139-144 have been considered but are moot in view of the new ground(s) of rejection.

Art Unit: 2872

11. It is noted by the Examiner that the specification and claim objections made in the previous Office Action have been withdrawn due to amendment by the Applicant.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Lee Fineman whose telephone number is (571) 272-2313. The examiner can normally be reached on Monday - Friday 7:30 - 4:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Drew Dunn can be reached on (571) 272-2312. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.



LAF

7 December 2006



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SUPERVISORY PATENT EXAMINER